

REMARKS:

In the outstanding Office Action, claims 1-24 were rejected. Claims 1, 15, 18-20 and 23 have been amended for clarification. New claim 25 has been added. Thus, claims 1-25 are pending and under consideration. No new matter has been added. The rejections are traversed below.

REJECTION UNDER 35 U.S.C. § 102(b):

Claims 1, 15, 18 and 19-22 are rejected under 35 U.S.C § 102(b) as being anticipated by U.S. Patent No. 5,701,403 to Watanabe et al.

Watanabe et al. is concerned with a two-dimensional (2D) and three-dimensional (3D) CAD system intended for use in the field of mechanical structure design. According to Watanabe et al., the system is provided with data that correlates between 2D planes generated by projection of a 3D object and 2D planes drawn by an engineer so that the engineer can edit the 2D planes that the engineer has drawn and cause the system to accordingly generate or edit a 3D model (see, col. 14, line 40 through col. 15, line 15). That is, the system disclosed by Watanabe et al. determines object constituting elements if they are produced by projection, and positions those so determined according to selected disposition rules obtained from various disposition rules (see, col. 13, lines 36-42 and col. 14, line 40 through col. 15, line 15). For example, when the engineer draws a half circle-shaped figure and a drawing symbol representing, for example, a gear in 2D, a corresponding 3D product model having the gear shape is created using a gear library in a database 4 (see, FIG. 4a). Thus, Watanabe et al. is limited to reflecting an object modification defined on a 2D drawing into drawings of the same model expressed in other 2D planes or 3D spaces.

The present invention, as illustrated in FIG. 2 for example, is directed to managing both an inter-model reference and an intra-model correspondence to reflect changes into structures not only within a model but also within inter-related models. Watanabe et al. does not teach or suggest, managing “an inter-model reference” to reflect changes based on inter-model relations.

As recited in amended independent claims 1, 15 and 18-20, the present invention includes, “managing correspondence between a two-dimensional design plane and three-dimensional design space across a first plurality of views for a target” and “managing a reference between models configured by at least one of a two-dimensional design plane and a three-dimensional design space across a second plurality of views for the target”. This enables

the present invention, for example, to reflect an operation in a 2D design plane or a 3D design space in one model such that processing of CAD data is correspondingly reflected on 2D design plane and 3D design space of another model.

Further, the present invention solves a problem presented in Watanabe et al. by allowing a designer to view “a reference between models configured by at least one of a two-dimensional design plane and a three-dimensional design space across a second plurality of views for the target” (claims 1, 15 and 18-20), thereby preventing inconsistent representation of CAD data. The inter-model reference management unit of the present invention also enables a CAD system that automatically generates a 3D model, while Watanabe et al. does not. For the above reasons, it is submitted that the independent claims are patentable over Watanabe et al.

The Examiner also compared 2D-3D link data 21 in FIG. 12 of Watanabe et al. with the inter-model reference management unit of the present invention. However, the 2D-3D link data base of Watanabe et al. only contains data representing relations existing between a 3D object and 2D drawings produced by projection of 3D portions (see, col. 23, lines 58-65). Therefore, the inter-model reference of the present invention indicating “inter-model” relations existing between different models is patentably distinguishable from the data contained in the 2D-3D link database of Watanabe et al.

For at least the above-mentioned reasons, claims depending from independent claims 1, 15 and 18-20 are patentably distinguishable over Watanabe et al.. The dependent claims are also independently patentable. For example, as recited in claim 22,

the three-dimensional reference is set between a three-dimensional design space of a first model and a three-dimensional design space of a second model according to two-dimensional reference of a plurality of two-dimensional design planes belonging to the first model to a two-dimensional design plane belonging to the second model, correspondence in the first model, and correspondence in the second model.

The Watanabe et al. method does not teach or suggest, “managing a reference between models configured by a two-dimensional design plane and a three-dimensional design space across a second plurality of views for the target” (claim 20 upon which claim 22 depends), where the three-dimensional reference is set between “a three-dimensional design space of a first model and a three-dimensional design space of a second model” in accordance with a “two-dimensional reference of a plurality of two-dimensional design planes belonging to the first model to a

two-dimensional design plane belonging to the second model...", as recited in claim 22. Thus, claim 22 further patentably distinguishes over Watanabe et al. for this additional reason.

REJECTION UNDER 35 U.S.C. § 103(a):

Claims 2-14, 16, 17, 23 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al.

For at least the reasons discussed above in relation to independent claims 1 and 15, dependent claims 2-14, 16 and 17 are also patentably distinguishable over Watanabe et al.. The dependent claims are also independently patentable. For example, claim 2 recites, "managing correspondence between a two-dimensional design plane and a three-dimensional design space across a plurality of views for a target" (claim 1 upon which claim 2 depends), where "said correspondence is a spatial attribute of each two-dimensional design plane in a model". The Watanabe et al. reference does not teach or suggest this feature of claim 2.

Independent claim 23 as amended also recites, "managing correspondence between a two-dimensional design plane and a three-dimensional design space across a plurality of views for a target" and "managing and displaying reference between models configured by a two-dimensional design plane and a three-dimensional design space across a plurality of views for the target". The Watanabe et al. method does not teach or suggest correspondence or relations that exist between 2D and 3D data of a component. Instead Watanabe et al. is limited to using stored drawing regulations to establish a correspondence between 3D objects on the basis of a 2D drawing.

For at least the reasons discussed above in relation to independent claim 23, it is submitted that dependent claim 24 depending from claim 23 is also allowable over Watanabe et al. Therefore, withdrawal of the rejection is respectfully requested.

NEW CLAIM:

New claim 25 has been added to emphasize that the present invention manages CAD data including, "generating a three-dimensional reference and a three-dimensional model in a three-dimensional plane from a two-dimensional reference and spatial attribute information in a two-dimensional plane for a target object", "setting a reference between the two-dimensional reference and the three-dimensional reference of the target object and collectively displaying the set reference" and "sequentially referencing the two-dimensional reference and the spatial attribute information to generate the three-dimensional model in the three-dimensional plane".

For the reasons discussed above, it is submitted that new claim 25 is patentably distinguishable over Watanabe et al..

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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